EFFECTIVE LEARNING OUTCOMES OF ESL ELEMENTARY AND SECONDARY SCHOOL STUDENTS UTILIZING EDUCATIONAL TECHNOLOGY INFUSED WITH CONSTRUCTIVIST PEDAGOGY

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ABSTRACT

This paper examines how ESL (English as a Second Language) elementary and secondary school students achieve effective learning outcomes through the use of technology infused with constructivist pedagogy. It focuses on a research study conducted by CELA (National Research Center on English Learning and Achievement) (Meskill et al., 1999).

The researchers (Meskill et al., 1999) selected two teachers from Indian River Central School District, New York to participate in the study. They observed various software such as authoring software and simulations in use.

Because the district emphasized funding in technology programs, the students were able to achieve their academic objectives while the teachers facilitated them. Unfortunately, most schools do not have advanced technologies, and even if they did, many teachers would not be equipped to use them (Adkins-Bowling et al., 2001). This creates a problem known as the digital divide which is one of the greatest inequity issues in the United States today (Lonergan, 2000).

MISSION STATEMENT

The purpose of this paper is to examine the potential of educational technology infused with constructivist pedagogy in ESL (English as a Second Language) classrooms and to explore alternatives for schools that lack advanced technological learning tools.

IDENTIFYING THE PROBLEM

According to the U. S. Department of Education: Office of English Language Acquisition (2002), limited English proficient (LEP) K-12 enrollment has increased by 95% from 1991-2002 (Table 1). Furthermore, the ethnic and linguistic diversity in the student population has become a challenge for teachers.

As a result of the increasing LEP student population and the diversity among the students, a major debate among educators on how to best instruct non-English speaking students began. Is there another alternative to the "chalk and talk" method (Adkins-Bowling et al., 2001)?

TABLE 1. THE GROWING NUMBERS OF LIMITED ENGLISH PROFICIENT STUDENTS

Year	Total K-12 Enrollment	Growth Since 1991	LEP Enrollment	Growth Since 1991
91-92	43,134,517	-	2,430,712	-
92-93	44,444,939	3%	2,735,952	13%
93-94	45,443,389	5%	3,037,922	25%
94-95	47,745,835	11%	3,184,696	31%
95-96	47,582,665	10%	3,228,799	33%
96-97	46,714,980	8%	3,452,073	42%
97-98	46,023,969	7%	3,470,268	43%
98-99	46,153,266	7%	3,540,673	46%
99-00	47,356,089	10%	4,416,580	82%
00-01	47,665,483	11%	4,584,946	89%
01-02	48,296,777	12%	4,747,763	95%

Source:The U.S. Department of Education: Office of English Language Acquisition (OELA), 2002.

INSIGHTFUL ALTERNATIVES

Currently, technology is vital for full participation in the economic, political, and social life in the United States. Therefore, schools must provide all students with the opportunity to become familiarized with technology and acquire the skills necessary to become efficient contributors to society (Adkins-Bowling et al., 2001).

CELA Research Study: Teacher Selection

Over a period of two years, the National Research Center on English Learning and Achievement (CELA) conducted a research study emphasizing the role of technology in an ESL (English as a Second Language) program (Meskill et al., 1999). The researchers (Meskill et al., 1999) chose two teachers from Indian River Central School District, in New York, based on the exit rates of ESL students in the district, length of time technology has been in place, and the teachers' expertise in ESL instruction and training in technology. Both teachers, that were selected, held Master's Degrees in Elementary Education and have had extensive training in technology.

Indian River Central School District's Commitment

Indian River Central School District's extreme commitment to technology integration in the ESL program is self-evident. Through the school district's generous grants the ESL teachers are able to receive continuing education through in-service workshops and a district instructional technology curriculum specialist. The funds are also used for purchasing equipment for labs, libraries, and classrooms. "Unlike many other school districts that view technology as a route to uniformity and consistency across curricula and grade levels, this district is casting technology in the role of catalyst for teacher reflection, creativity, and change (Meskill et al., 1999)."

Uniqueness of E-text vs. Print

E-text (electronic text) is on-screen information within computers. It is available in a variety of forms such as games, simulations, educational software, talking books, telecommunications, etc. (Meskill et al., 1999). Because of its diverse forms, there are major differences between e-text and print. For example, e-text provides visual, textual, and audio components while print contains textual and/or visual elements. Also, e-text is anarchic where as print is hierarchical and static. The anarchic features of e-text allow students to control and edit information spontaneously (Ulmer, 1989). Therefore, computers are dynamic tools that allow students to construct meaning through the use of multiple senses.

Once Upon A Time

The researchers (Meskill et al., 1999) observed ESL students as they used simulation and authoring software, while their teachers facilitated in the learning process. With *Once Upon A Time*, an authoring software program, second grade ESL students can create stories based on a theme of their own choosing. There are a variety of backgrounds, characters, and objects students can select from to design a scene reflecting their story. Since the program also features an audio component, students were able to hear the name and pronunciation of the object they "clicked" on. Creating a scene prior to writing their story assisted them in organizing their story and staying within their theme.

Oregon Trail

By using a simulation call *Oregon Trail*, fourth grade ESL students are exposed to the real experiences of traveling on the Oregon Trail during the mid-1800s. Students become energized and collaborated with their peers to reach a common goal. Because they are able to control their adventure, the lesson becomes more relevant to them. "The language they use to cross rivers, hunt, and look after their health is imbued with dialogic meaning that connects with life experience and goes well beyond mere linguistic comprehension (Meskill et al., 1999)."

Widget Workshop

Next, the researchers (Meskill et al., 1999) observed a group of four eighth grade ESL students who were using a program called *Widget Workshop*. It is a program that simulates electrical, biological, and mathematical connections. Through the use of this program the students' academic language was enhanced while they were using a higher level of thinking. The teacher said that the students felt empowered and motivated because they were able to accomplish practical hands-on tasks like those found in *Widget Workshop.*

Technology Infused with Constructivism: An Overview

The teachers observed in the research study utilized educational technology infused with constructivist pedagogy. By using computers, students were able to work collaboratively and autonomously at the same time. Therefore, students saw their cohorts as resources, not competitors (Lunenberg, 1998). When students encountered a problem, they were encouraged to ask their peers for assistance. If the problem persisted, the teachers will facilitated their students by asking thoughtful open-ended questions. They allowed their students' responses to guide their lessons, alter instructional strategies, and alter content (Lunenberg, 1998). As a result, the teachers encouraged open-dialogue with students while using computers as a "mediator of linguistic interaction (Meskill et al., 1999)."

POTENTIAL VS. REALITY

Although much research has proven that technology can assist all students effectively in academic achievement (Adkins-Bowling et al., 2001, Clovis, 1997, Lunenberg, 1998, and Winn, 2002), the above research illustrates a scenario that is not very common in public schools. The classrooms and instructors observed in the study were exemplary, but the fact is that most schools do not receive grants to support a technology program of such grandeur. Usually, there are a few computers in the classroom and/or a computer lab in the school. In severe cases, there may be a limited set of outdated computers in the school. Most in-service training for teachers, in the area of technology, is insufficient to prepare them to use educational software. Teachers must have the skill necessary to utilize technology efficiently otherwise they do not have "real" access to technology. Without these vital skills, they will not have their students work on computers often. Thereby, leaving the students knowledge-deprived because they will lack the opportunity to explore technology (Web-Based Education Commission, 2000).

These issues cause an inequity known as the digital divide which is a gap that separates individuals with access to novel technology and those who do not (Lonergan, 2000). Because the federal government is aware of this gap, they have made an effort to place technology in schools. In 1998, 89% of schools and 51% of classrooms were connected to the Internet (Bolt & Crawford, 2000). Although more schools and classrooms have computers, the gap continues to grow because the teachers are not trained well to use them effectively.

RATIONAL SOLUTION

Adkins-Bowling, Brown, and Mitchell (2001) recommend the following strategies for teacher training:

a. development of software programs that can be used as a training tool to assist teachers in utilizing different technologies to assist ESL students.

b. there should be an increase in funding from federal or local agencies for training.

c. additional assistance and interval upgrades should be provided.

d. teacher education programs' curriculums need to provide more hands-on technology experience.

However, teachers can still use other forms of technology to instruct ESL students effectively if computers are not available or if they need additional training.

A Teacher Discovers the Value of Television

Donna Clovis (1997), an ESL teacher in Princeton, New Jersey, discovered that TV and video can be effective learning tools to assist ESL students in achieving their learning outcomes effectively. For example, when the students are watching a video, she would pause the tape to ask open-ended questions. By doing this she starts an open class discussion about the video. To tap into higher level thinking skills, she would have her students predict what they think would happen next.

Closed captioning, a feature that shows the text at the bottom of the TV screen, was one of her favorite elements of TV/video (Clovis, 1997). She chose key vocabulary words from instructional videos and was able to reinforce those words by having the students play games. By using TPR (total physical response), students would stand up, clap their hands, stomp their feet, etc. when they see a key vocabulary word. Also by muting the sound, the students can read aloud while the TV provides them with a visual, allowing them to construct meaning from the text.

By using TV/video the students were able to increase their success in mainstream classrooms. TPR, hands-on activities, and multi-sensory learning activities were able to assist them in enhancing their second language acquisition. In fact, a few of her students had something to say about their feelings for TV and video. Marcos, an ESL student from Brazil said, "Now I can read just like my American friends (Clovis, 1997)." Tony, from China says, "TV and video help me to learn English better and I understand more (Clovis, 1997)." Ana, from Germany added, "And I can't wait to come to class (Clovis, 1997)"

THE PRIMITIVE RADIO

Whether a school can afford innovative technology or not, the radio is a familiar learning tool that is also inexpensive. According to Wipf (1984) there are several advantages for using the radio (Kitay, 2000):

1. It exposes students to a wide variety of regional accents and idiomatic lan-

guage (a source of authentic language). Students are provided with a wide variety of speakers to increase their listening comprehension skills.

2. Grammar can be taught within the context of real language.
3. Students can become accustomed to listening to the target language at normal speed.
4. Recorded broadcasts can become a source of motivation and inspiration for second language learners.
5. Recorded radio programs provide students with a greater awareness of events happening around the globe.
6. Radio broadcasts can enliven the curriculum and can take away the ennui of learning a second language.
7. New vocabulary can be introduced.
8. Advanced students, in particular, can use the radio to study independently and work at their own rate of speed and can select the programs of their choice.

If a CD (compact disc) player or cassette tape player is available, teachers can obtain instructional CDs/cassette tapes to use instead. It is more reliable than the radio since the sound quality of a CD/cassette tape is much greater, and CD/cassette tape tracks can be played repeatedly if necessary.

CONCLUSION

There is no doubt that educational technologies infused with constructivist pedagogy allow ESL students to think, create, and visually demonstrate their work. In synthesizes a learning environment where it is conducive to second language acquisition, acquisition of academic literacy skills, and acquisition of technology skills (Meskill et al., 1999). Unfortunately, a digital divide exists, and it is one of the greatest inequities in the United States today (Lonergan, 2000). Instead of only pouring monies into putting innovative technology into schools, it is imperative that the federal government also support a technology training program for teachers. According to the Milken Exchange on Educational Technology and the International Society for Technology in Education (ISTE) "most teacher-training programs treat computer technology as an adjunct to the curriculum, and not as a central feature (Bolt & Crawford, 2000)." Without sufficient training, teachers will not be equipped to prepare their students to function in the fast-changing society.

Technology programs are extremely expensive and require a yearly investment that many schools cannot afford. Therefore, schools and teachers must look to other alternatives to help their ESL students reach their goals and be successful. TV/video and the radio are basic sources of technology that can be effective when constructivism is used to deliver the lessons. However, even those tools cannot replace the uniqueness of technology and the potential role it plays in language acquisition (Meskill et al., 1999).

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